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## AUTOMATED CONFLICT RESOLUTION ISSUES

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H-1

## INTRODUCTION

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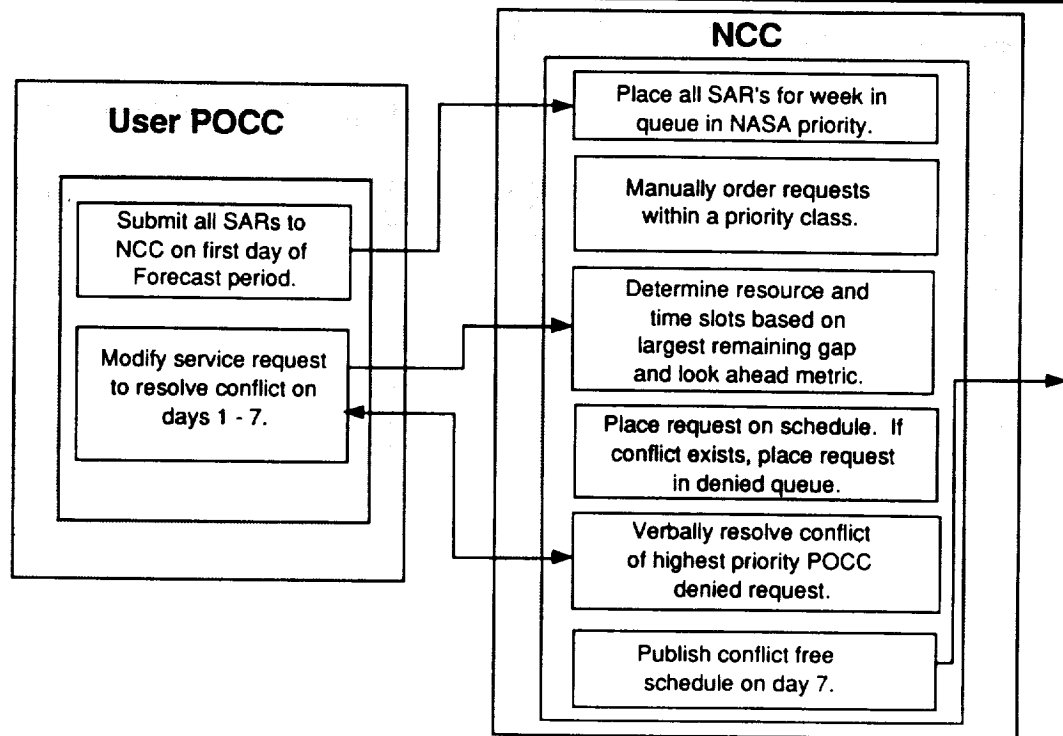
### **Purpose:**

- **To initiate discussion of how conflicts for Space Network resources should be resolved in the ATDRSS era.**

### **Topics:**

- **Describe how resource conflicts are currently resolved.**
- **Describe issues associated with automated conflict resolution.**
- **Present conflict resolution strategies.**
- **Suggest discussion topics.**

## **CURRENT SN CONFLICT RESOLUTION**



3  
H-3

## **CURRENT OPERATIONAL LIMITATIONS**

**Current conflict negotiation is a verbal, time consuming process between Forecast Analysts and user POCCs.**

**Security prohibits POCCs from accessing entire schedule.**

**Forecast Analyst lacks automated scheduling tools and user knowledge.**

**Current SN service requests do not utilize POCC tolerance.**

- Requests allow specifying plus or minus time tolerance.
- Configuration codes may indicate "open selection" for antenna and interface channel.

## **CURRENT SOFTWARE LIMITATIONS**

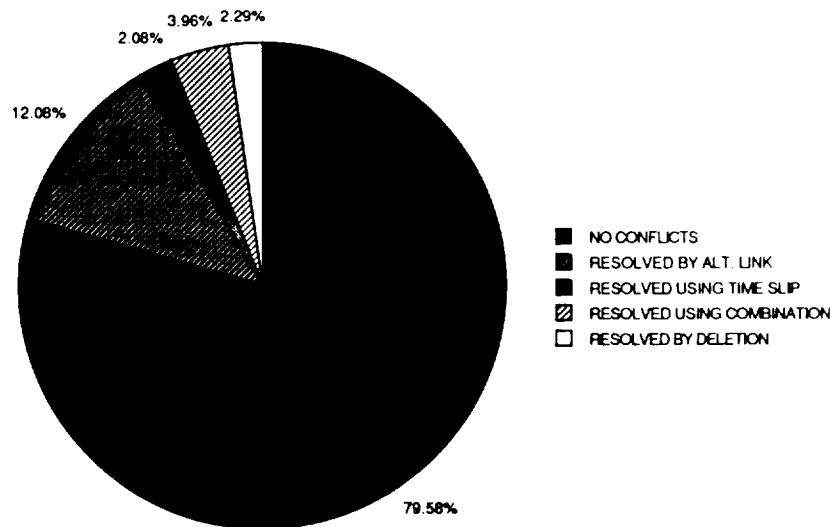
**Current NCC scheduler emphasizes conflict avoidance, rather than conflict resolution.**

- Events scheduled to avoid potential conflicts.
  - Leave largest gap of unscheduled time
  - Look-ahead metric schedules event to avoid conflict with remaining events.

**No knowledge of the applicability or preference of individual conflict resolution strategies.**

5  
H-5

## **CURRENT CONFLICT RESOLUTION**



**The fact that ninety percent of the conflicts were resolved indicates that user flexibility exists.**

6  
H-6

## **ATDRSS ERA CONFLICT RESOLUTION**

**ATDRSS era service requests will increase three to ten fold.**

**Manual conflict resolution will cause unacceptable response times and life cycle costs.**

**Automated conflict resolution requires knowledge:**

- Embedded in the SNC scheduling system.
- Identified by the user POCC in each specific service request

7  
H-7

## **EMBEDDED KNOWLEDGE**

**Knowledge requirements:**

- User capabilities
- User preferences
- SN resource data

**Conflict resolution profile created for each user POCC**

- Hierarchy of conflict resolution strategies
- Service parameter tolerances and dependencies

**SNC generated alternatives approved by the user POCC.**

8  
H-8

## **USER SPECIFIED KNOWLEDGE**

**Include knowledge in the user POCC service request.**

**Prioritize request tolerances and alternatives.**

**Information exchange facilitated by implementation of a user Pocc workstation.**

- Graphically display schedule and service flexibility.
- Simultaneously display data at the SNC and POCC.

9

H-9

## **FACTORS INFLUENCING CONFLICT RESOLUTION**

**Organizational goals affecting conflict resolution are:**

- NASA established user POCC priority.
- Certain users assigned specific links.
- Hold back resources as spares.
- Maximize utilization of single resources.
- Leveling of resource utilization across the system.
- Rewarding cooperation.

**Operational limitations affecting conflict resolution:**

- Development (forecast) period.
- Maintenance (active) period.
- Spacecraft emergencies.

## **MANUAL CONFLICT RESOLUTION**

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**Special circumstances will require manual conflict resolution by the SN scheduling analyst.**

- Two POCCs with same priority (Space Station and Space Shuttle) have a resource conflict.
- Spacecraft emergencies conflict with higher priority user POCC services

11

H-11

## **CONFLICT RESOLUTION STRATEGIES**

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**Potential strategies include:**

- **Priority.**
- **Moving a service in time.**
- **Moving a service to the previous or next valid view period.**
- **Switching to an alternate resource.**
- **Shrinking a service duration.**
- **Breaking up a prototype event into individual services, and performing separate conflict resolution strategies on the individual services.**
- **Breaking up a service into multiple discontinuous services, or gapping.**
- **Combinations of the above strategies.**
- **Deleting a service from the schedule.**

12

H-12

## **DISCUSSION TOPICS**

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- **What specific conflict resolution strategies are applicable to the user POCCs?**
- **How much would conflict resolution strategies and preferences vary between services of a specific user POCC?**
- **How much would conflict resolution strategies and preferences vary between different user POCCs?**
- **Does a hierarchy of strategy preferences exist?**
- **Under what circumstances should manual conflict resolution be required?**
- **How amenable to automatic conflict resolution are user POCCs?**
- **How much and what type of tolerance could be communicated to the NCC from user POCCs?**
- **How much would tolerances vary between services of a specific user POCC?**

13

H-13

